UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/500,366	02/08/2000	Paul W, Dent	P-4015-359	2492

24112	7590	09/12/2005

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EXAMINER
WANG, TED M

ART UNIT	PAPER NUMBER
2634	

DATE MAILED: 09/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Supplemental **Office Action Summary**	**Application No.** 09/500,366	**Applicant(s)** DENT, PAUL W,
	Examiner Ted M. Wang	**Art Unit** 2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 January 2005*.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-79* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-20* is/are allowed.

6)☒ Claim(s) *21,22,25,26,29-33,40-43,54-58,65,67-70 and 77-79* is/are rejected.

7)☒ Claim(s) *23,24,27,28,34-39,44-53,59-64,66 and 71-76* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 April 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4)☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. *09/01/2005* .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Response to Arguments

1.   Applicant's arguments, filed on 01/24/2005, with respect to claims 27, 28, 34-36, 44-

49, 59-61, 63, 64, 66, and 71-76 have been fully considered and are persuasive. The

rejection of 35 USC § 103(a) has been withdrawn.

2.   Applicant's arguments, filed on 01/24/2005, with respect to claims 21, 22, 25, 26,

29-33, 40-43, 54-58, 65, 67-70, 77, and 78, have been fully considered but they are not

persuasive. The Examiner has thoroughly reviewed Applicants' arguments but firmly

believes that the cited reference to reasonably and properly meet the claimed limitations.

   Claims 54-57

   (1) *Applicants' argument –*

          a) "However, nothing in this section or in any other portion of Razzell even

             suggests combining or otherwise modifying the input bits before filtering.

             Razzell simply describes a filtering technique that is applied directly to the

             input bits." as recited.

          b) "Because Razzell only filters the input bits and because Razzell does not

             teach or suggest any filtering operations on any type of derived bits, Razzell

             cannot anticipated independent claim 54, or claims 55 – 57" as recited.

   Examiner's response – In response to applicant's argument as recited in the above

paragraph that

          With regard a), the cited patent Razzell teaches that a data signal comprising

a succession of binary bits is produced by a source 10. The bits are suitably

encoded as 2 bit symbols in an encoder 11. The symbols are applied to a

differential encoder 12 to generate a 3-bit symbols output. Clearly, the 2-bit symbol

from the encoder 10 output and 3-bit symbol from the differential encoder 12 output

are derived from the input bit from the source 10 output and thus, Razzell does

suggests combining or otherwise modifying the input bits before filtering (14 and

15).

With regard b), the cited patent Razzell further teaches that Quadrature

related differentially encoded symbols I and Q are applied to raised cosine filters

14,15 which produce filter sequences which are applied to respective digital to

analogue converters (DAC) 16,17 which may include reconstruction filters, wherein

the encoder 11 output symbols and differentially encoder 12 output symbols are

derived bits derived from the input bits generated from source 10.

Thus, for the explanation addressed in the above paragraph, the rejection

under 35 U.S.C. 102(b) with Razzell's reference is adequate.

Independent Claims 24, 41, and 67

(2) *Applicants' argument –*

a) "Dent '291 describes an inventive system and method of providing a

decodulation (a combination of demodulation and decoding), and is therefore

related to the receiving end of a wireless system. However, as discussed

above, Razzell describes a modulation technique for transmission signals,

and is therefore related to the transmitting end of a wireless system. Because

Dent .291 describes an element in a receiver, while Razzell describes an

element in a transmitter, the references are unrelated and there is no

motivation to combine the teachings of the two references." as recited.

b) "Second, even if arguendo there is motivation to combine Razzell with Dent

'291, the resulting combination does not teach the claimed invention. ....

However, the cited sections simply describe how input bits may be combined

in a transmitter to generate parity bits. As is well understood in the art, parity

bits are part of error correction schemes and are not related to the generation

of real and imaginary parts of modulation waveforms. As such, the parity bit

generation in Dent '291 is wholly different from the derived bit generation of

the claimed invention. Because, as discussed above, Razzell also does not

teach generating derived bits by combining input bits, Razzell does not solve

the defects of Dent .291." as recited.

c) "However, the combiners (elements 44 and 46 in Figure 5 of Razzell)

combine the filtered input bits. Contrastingly, the combiner of claim 21

combines filtered waveform segments generated by filtering the derived bits.

As such, even if Razzell is combined with Dent '291, the resulting

combination does not teach each and every limitation of independent claim

21." As recited.

Examiner's response -- In response to applicant's argument as recited in the above

paragraph that

With regard a), the cited patent Dent '291 teaches a transmitter Fig.2a with

necessary transmission components such as input bit source 20, encoder 21,

interleaver 22, modulation waveform generator 23, balance I/Q filter 24, mixer

25/26, upconverter 31, and power amplifier 33 for transmission signal. Razzell

describes a modulation technique for transmission signals, and is therefore related

to the transmitting end of a wireless system. Because Dent .291 teaches an

element in a transmitter as described in the above paragraph, while Razzell also

teaches an element in a transmitter, the references are related and thus, there is

motivation to combine the teachings of the two references as addressed in the

previous office action, paper # 9, dated 9/20/2004.

With regard b), the cited patent Dent '291 teaches the followings:

An input bit source 20, encoder 21, interleaver 22, modulation waveform generator

23, balance I/Q filter 24, mixer 25/26, upconverter 31, and power amplifier 33.

Fig.2b shows an example of a constraint length 6, rate 1/3 encoder (column 8 line 9

– column 11 line 6) that encodes or derives the input bits generated by input bit

source 20 into symbols. Inherently, the encoded symbols are derived from the input

bits.

With regard c), the cited patent Razzell teaches that a data signal comprising

a succession of binary bits is produced by a source 10. The bits are suitably

encoded as 2 bit symbols in an encoder 11. The symbols are applied to a

differential encoder 12 to generate a 3-bit symbols output. Clearly, the 2-bit symbol

from the encoder 10 output and 3-bit symbol from the differential encoder 12 output

are derived from the input bit from the source 10 output. Razzell does suggests

combining or otherwise modifying the input bits and derived bits before filtering (14

and 15), thus the combiners (elements 44 and 46 in Figure 5 of Razzell) not only

combine the filtered input bits but also combine the filtered derived bits.

Thus, for the explanation addressed in the above paragraph, the rejection under 35

U.S.C. 103(a) with Dent '291 and Razells' references are adequate.

Claim Rejections - 35 USC § 102

3.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign
country or in public use or on sale in this country, more than one year prior to the date of
application for patent in the United States.

4.   Claims 54-57 and 79 are rejected under 35 U.S.C. 102(b) as being anticipated by

Razzell (US5,428,643).

□   In regard claim 54 and 79, Razzell discloses a method of and transmitter for

transmitting a digital signal with receiving over a plurality of symbol periods

successive data symbols to be transmitted, each data symbol comprising a plurality

of input bits (Fig.1 element 10-13 and column 3 line 42 – column 4 line 21):

combining the input bits in said data symbols to generate derived bits (Fig.1, Fig.5,

and Fig.6 elements 10-13 and column 3 line 42 – column 4 line 21):

bit-wise filtering selected input bits and derived bits to generate component

waveforms (column 4 line 8 – column 5 line 20);

generating filtered quadrature modulation waveform signal having a real part and an

imaginary part (Fig.1 elements 13-17, Fig.5 elements 13, and 30-52, and Fig.6

elements 13, shift registers, look up tables, and 44, and 46) by selectively

combining the component waveforms using weighting factors selected to produce a

desired signal constellation (column 4 line 1- column 6 line 54).

□ In regard claim 55, all limitation can further be taught in Fig.5 elements shift

registers, ROM, 31-46, 16-28, and column 5 line 26 – column 6 line 39.

□ In regard claim 56, the limitation that the filtered waveform segments are stored as

one or more numerical sample values can further be taught in Fig.3 and Fig.5

elements 40 and 42, column 5 line 1- column 6 line 39.

□ In regard claim 57, the limitation of addition at least two component waveforms in a

filter adder to form the imaginary part of the modulation waveform; and addition at

least two component waveforms in a filter adder to form the real part of the

modulation waveform can further be taught in Fig.5and 6 elements 46 and 44 and

column 6 lines 1-54.

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or
> described as set forth in section 102 of this title, if the differences between the
> subject matter sought to be patented and the prior art are such that the subject
> matter as a whole would have been obvious at the time the invention was made to a
> person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

6.   Claims 21, 22, 25, 29-33, and 40-43, 67-70, 77, and 78 are rejected under 35

U.S.C. 103(a) as being unpatentable over Dent (US5,673,291) in view of Razzell

(US5,428,643).

□ In regard claim 21, Dent discloses a communication transmitter with inputting data

symbols to a logic unit over a plurality of successive symbol periods, wherein each

data symbol comprises a plurality of information bits (Fig.2a elements 20-22 and

column 5 lines 14-52);

forming in the logic unit at least two derived bits during each symbol period by

combining selected information bits (Fig.2b, column 5 lines 24-67, and column 8

lines 1-67);

forming, during each symbol period, a plurality of bit sequences, each bit sequence

containing bits input or derived over a plurality of symbol periods (column 5 lines 14-

67 and column 11 line 7 – column 12 line 4);

generating, during each symbol period, a plurality of filtered waveform segments

using the bit sequences (column 11 line 16 – column 12 line 4) except specifically

teaching combining, during each symbol period, at least two of the filtered waveform

segments to obtain a segment of the imaginary waveform part and combining,

during each symbol period, at least two of the filtered waveform segments to obtain

a segment of the real waveform part.

Razzell teaches a method of and transmitter for transmitting a digital signal with

combining, during each symbol period, at least two of the filtered waveform

segments to obtain a segment of the imaginary waveform part (Fig.5 and 6 element

46 and column 5 line 26 – column 6 line 54); and combining, during each symbol

period, at least two of the filtered waveform segments to obtain a segment of the

real waveform part (Fig.5 and 6 element 44 and column 5 line 26 – column 6 line

54) so as to reduce the size of the lookup table and memory such that the

transmitter design complicity is reduced.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Dent's modulation waveform generator and balanced I/Q filter in view of Razzell's teaching in order to reduce the size of the lookup table and memory such that the transmitter design complicity is reduced.

❑ In regard claim 22, the limitation that the data symbol comprises first, second, and information bits can further be taught by Razzell in Fig.1 and column 3 line 42 – column 4 line 21.

❑ In regard claim 25, the limitation that the filtered waveform segments each comprise a number of numerical samples spaced over each symbol period can further be taught by Razzell in Fig.5 elements 13, 41A, and 42, and column 5 line 42 – column 4 line 21.

❑ In regard claim 29, the limitation that combining at least two of the filtered waveform segments to form a segment of the imaginary part of the modulation waveform comprises forming a weighted sum of a numerical sample of a first filtered waveform segment with a numerical sample of at least one other filtered waveform segment can further be taught by Razzell in Fig.5 and 6 element 46 and column 5 line 26 – column 6 line 54.

❑ In regard claim 30, the limitation that combining at least two of the filtered waveform segments to form a segment of the real part of the modulation waveform comprises forming a weighted sum of a numerical sample of a first filtered waveform segment with a numerical sample of at least one other filtered waveform segment can further be taught by Razzell in Fig.5 and 6 element 44 and column 5 line 26 – column 6 line 54.

- In regard claim 31, the limitation that combining at least two of the filtered waveform segments to form a segment of the imaginary part of the modulation waveform comprises connecting a first filtered waveform segment through a first impedance to an output terminal and connecting a second filtered waveform segment through a second impedance to the output terminal to produce a weighted sum of the combined filtered waveform segments at the output terminal can further be taught by Razzell in Fig.5 element 46 combiner output.

- In regard claim 32, the limitation that combining at least two of the filtered waveform segments to form a segment of the imaginary part of the modulation waveform comprises connecting a first filtered waveform segment through a first impedance to an output terminal and connecting a second filtered waveform segment through a second impedance to the output terminal to produce a weighted sum of the combined filtered waveform segments at the output terminal can further be taught by Razzell in Fig.5 element 44 combiner output.

- In regard claim 33, the limitation that generating a plurality of filtered waveform segments comprises using the bit sequences as an address to a look-up table containing pre-computed filtered numerical samples of the filtered waveform segments can further be taught by Razzell in column 26 – column 6 line 39.

- In regard claim 41, which is a waveform generator claim related to claim 21, all limitation is contained in claim 21. The explanation of all the limitation is already addressed in the above paragraph.

❑ In regard claim 42, which is a waveform generator claim related to claim 33, all limitation is contained in claim 33. The explanation of all the limitation is already addressed in the above paragraph.

❑ In regard claim 43, which is a waveform generator claim related to claim 25, all limitation is contained in claim 25. The explanation of all the limitation is already addressed in the above paragraph.

❑ In regard claim 44, the limitation of the data symbols are 8-PSK symbols can further be taught by Dent '291 in column 12 lines 22-29

❑ In regard claim 67, the limitation that the first and second combiners use weighting factors to combine said component waveforms selected to produce a desired signal constellation can further be taught by Razzell in (column 4 line 1- column 6 line 54). All other limitation is contained in claim 41. The explanation has been described in above paragraph.

❑ In regard claim 68, the limitation that the filter comprises a lookup table storing pre-computed component waveform can further be taught by Razzell in Fig.5 elements shift registers, 30-38, and column 5 line 26 – column 6 line 39.

❑ In regard claim 69, all limitation can further be taught Razzell in Fig.5 elements shift registers, ROM, 31-46, 16-28, and column 5 line 26 – column 6 line 39.

❑ In regard claim 70, the limitation that the first and second combiners comprise adders to add selected component waveforms can further be taught by Razzell in Fig.5 elements 44 and 66.

❑ In regard claim 77, the limitation that the first and second combiners use weighting

factors selected to produce a rotated signal constellation can further be taught by

Razzell in (Fig.3 and column 4 line 1- column 6 line 54).

❑ In regard claim 78, the limitation that the first and second combiners use weighting

factors selected to produce a rotated signal constellation rotated approximately 22.5

degrees can further be taught by Razzell in Fig.2 elements "0" –"7" and column 3

line 61 – column 4 line 41.

7.   Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dent

(US5,673,291) in view of Razzell (US5,428,643) and further in view of Dent

(US5,867,537).

❑ In regard claim 26, Dent ('291) and Razzell discloses all limitation as described in

the above paragraph except specifically teaching that the filtered waveform

segments are represented by a sequence of sigma-delta values.

Dent ('537) teaches a balanced transversal I,Q filters for quadrature modulations

that the filtered waveform segments are represented by a sequence of sigma-delta

values (Fig.2 element 41 and column 2 line 52 – column 3 line 48) so as to improve

practical silicon integratable tolerances for manufacture of continuous-time filters

covering radio communication range such that the cost and size of the transmitter

can be reduced.

It would have been obvious to one of ordinary skill in the art at the time of the

invention to modify Dent ('291) and Razzells' modified waveform generator and

balanced I/Q filter in view of Dent's ('537) teaching in order to improve practical

silicon integratable tolerances for manufacture of continuous-time filters covering

radio communication range such that the cost and size of the transmitter can be reduced.

8.   Claims 58 and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Razzell (US5,428,643) in view of Dent (US5,867,537).

    ❑ In regard claim 58, Razzell discloses all limitation as described in the above paragraph except specifically teaching that the component waveforms are stored as a set of sigma-delta sample values.

Dent ('537) teaches a balanced transversal I,Q filters for quadrature modulations that the component waveforms are stored as a set of sigma-delta sample values (Fig.2 elements 41-44, Fig.4 elements 50a and 50b, column 4 line 52 – column 6 line 53, and column 6 lines 9-53) so as to eliminate the adjacent channel interference such that the signal quality received at receiver end is improved.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Razzell's transmitter to store the component waveforms as a set of sigma-delta sample values in memory in view of Dent ('537) teaching in order to eliminate the adjacent channel interference such that the signal quality received at receiver end is improved.

    ❑ In regard claim 65, the limitation that the weighting factors are selected to produce a rotated signal constellation can further be taught by Razzell in Fig.2 elements "0" – "7" and column 3 line 61 – column 4 line 41.

Allowable Subject Matter

9.   Claims 1-20 are allowed.

10.   Claims 23, 24, 27, 28, 34-39, 44-53, 59-64, 66, and 71-76 are objected to as being

dependent upon a rejected base claim, but would be allowable if rewritten in independent

form including all of the limitations of the base claim and any intervening claims.

   □ The examiner's statement of reasons for allowance has been given on paper # 5

     filed on 3/18/2004.

Conclusion

11.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

12.   A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until

after the end of the THREE-MONTH shortened statutory period, then the shortened

statutory period will expire on the date the advisory action is mailed, and any extension fee

pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action.

In no event, however, will the statutory period for reply expire later than SIX MONTHS from

the date of this final action.

13.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Ted M. Wang whose telephone number is 571-272-3053.

The examiner can normally be reached on M-F, 7:30 AM to 5:00 PM.

       If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Stephen Chin can be reached on 571-272-3056. The fax phone number for

the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published

applications may be obtained from either Private PAIR or Public PAIR. Status information

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about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on

access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-

217-9197 (toll-free).

Ted M Wang
Examiner
Art Unit 2634

Ted M. Wang

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